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(54) A conveyor

(57) The invention relates to a conveyor (1) provided with a frame (15) and with an endless conveying element (1), which can be moved in its longitudinal direction (A) by driving means (18,20) during operation. The conveying element (1) furthermore comprises interconnected carriers (1), which are pivotable with respect to each other about upwardly extending pivot pins (11). The carriers (1) are guided by means of guide wheels (13) cou-

pled to the carriers (1), which during operation roll on guide rails (15) connected to the frame, and which are near their ends provided with guide wheels (16), which are rotatable about axes of rotation extending parallel to the pivot pins. A pivot pin (11), about which a carrier (1) is pivotable with respect to the adjacent carrier (1), lies in one plane with the axes of rotation (13) extending parallel to the pivot pin (11) of the guide wheels (13) provided on the adjacent carrier (1).

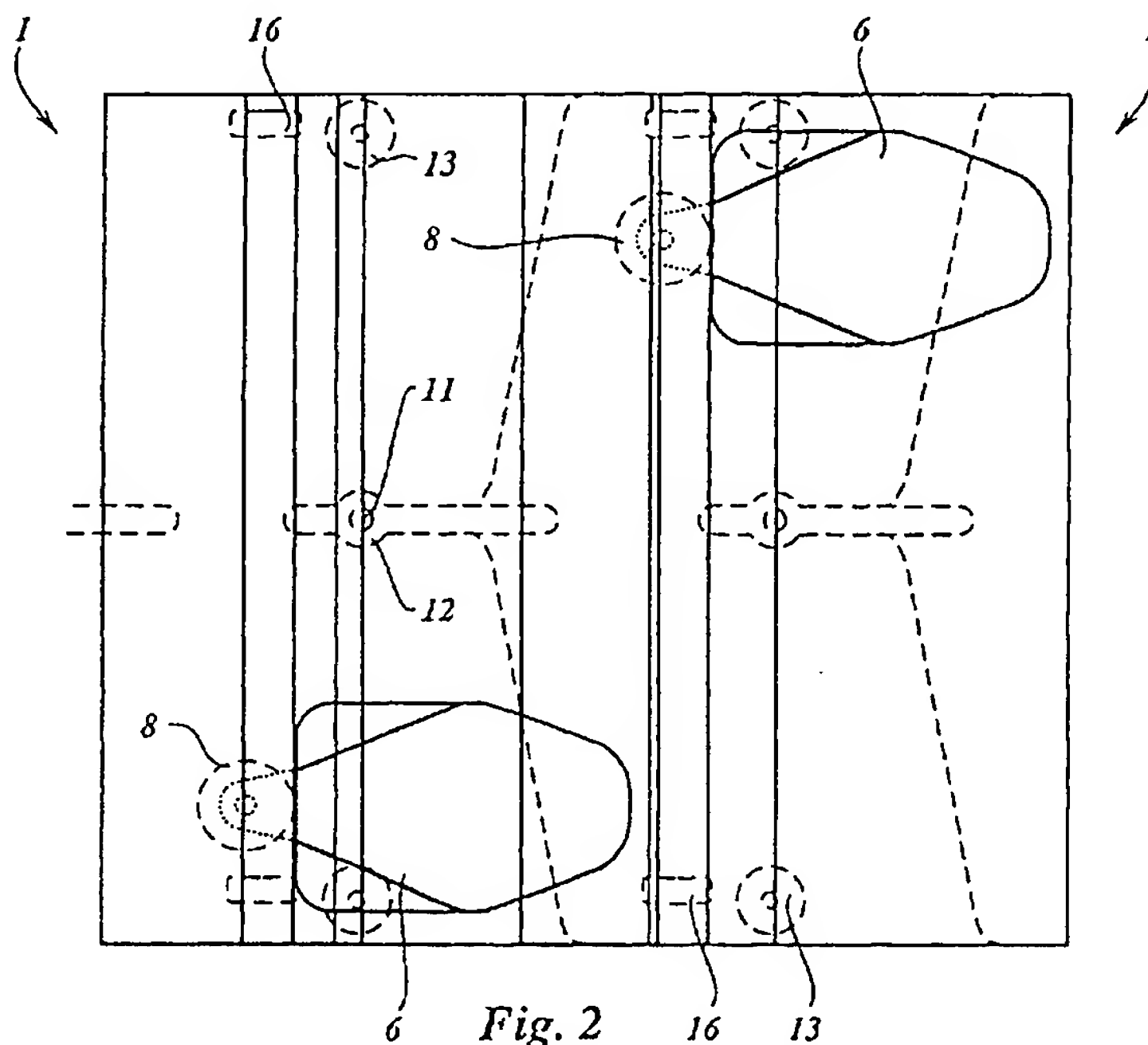


Fig. 2

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Description

The invention relates to a conveyor provided with a frame and with an endless conveying element, which can be moved in its longitudinal direction by driving means during operation and which is provided with interconnected carriers, which are pivotable with respect to each other about upwardly extending pivot axes, whilst the carriers are guided by means of guide wheels coupled to said carriers, which during operation roll on guide rails connected to the frame.

A conveyor of this type is for example known from European Patent Applications Nos. 0 626 324 and 0 628 502. These known conveyors are satisfactory per se in practice, but in certain cases a better guidance and support of the carriers may be desirable.

According to the invention this may be accomplished in that said carriers are near their ends provided with guide wheels, which are rotatable about axes of rotation extending parallel to said pivot axes, whilst a pivot axis, about which a carrier is pivotable with respect to the adjacent carrier, lies at least substantially in one plane with the axes of rotation extending parallel to said pivot axis of the guide wheels provided on said adjacent carrier.

By arranging the pivot axis about which a carrier is pivotable with respect to the adjacent carrier in one plane with the axes of rotation of the guide wheels guiding said adjacent carrier and rolling on guide rails, movement of the pivot axis in question in a direction transversely to the longitudinal direction of the guide rails is prevented. In fact the position of the pivot axis of a carrier as well as the position of the guide wheels connected to said carrier, which guide wheels are rotatable about axes of rotation extending parallel to said pivot axis, with respect to the rails co-operating with the respective guide wheels are fixed, therefore, as a result of which undesirable oscillating movements of a carrier about an upwardly extending axis are prevented.

When according to another aspect of the invention guide rollers being rotatable about axes of rotation crossing the pivot axes at least substantially perpendicularly are provided near the sides of a carrier, near the guide wheels provided on the carrier in question, which guide wheels are provided in such a manner as to be rotatable about axes of rotation extending parallel to said pivot axes, oscillating movement of a carrier about an axis extending transversely to the longitudinal direction of the endless conveying element is also prevented in an effective manner.

All this leads to a stable support of the carriers and also to a steady movement of the carriers, which is conducive to a controlled transport of the goods to be conveyed by the conveyor.

The invention will be explained in more detail hereafter with reference to a few embodiments of the construction according to the invention diagrammatically illustrated in the accompanying Figures.

Figure 1 is a diagrammatic perspective view of a part of the conveying element built up of interconnected carriers.

Figure 2 is a plan view of a part of the conveying element.

Figure 3 is a cross-sectional view of a few interconnected carriers.

Figure 4 is a front view of a carrier.

Figure 5 is a diagrammatic perspective view of a second embodiment of a conveying element built up of interconnected carriers.

Figure 6 is a cross-sectional view of a few of the carriers of the conveying element shown in Figure 5.

Figure 7 is a front view of a carrier shown in Figures 5 and 6.

Figure 8 is a diagrammatic view of a further possible arrangement of guide wheels coupled to one end of a carrier.

Figure 1 shows a few carriers 1 of a endless conveying element built up of such pivotably interconnected carriers, which will be moved in the direction according to arrow A during normal operation. As is apparent in particular from Figure 3, a carrier 1 used in the illustrated embodiment is built up of a central portion 2, whereby a plate-shaped part 3 extending in forward direction, seen in the direction of movement according to arrow A, joins the bottom side of said central portion 2, whilst a plate-shaped part 4 extending in a direction opposed to the intended direction of movement according to arrow A joins the upper side of said central portion 2. As is apparent from Figure 1, plate-shaped part 3 is substantially triangular, seen in plan view.

A slot 5 extending in the longitudinal direction of the carrier, transversely to the intended direction of movement of conveying element A, therefore, is provided in central portion 2 of carrier 1. A pusher shoe 6 rests on the upper side of carrier 1, which upper side 15 made up of the upper surfaces of central portion 2, which are in line, and the rearwardly projecting plate-shaped part 4. An arm 7 extending through slot 5 is attached to the underside of said pusher shoe. A guide roller 8 is attached to the underside of arm 7, which guide roller is capable of co-operation with guide members (not shown) during operation, in order to be able to move pusher shoe 6 to and fro along carrier 1, as is for example described in the aforesaid publications.

An arm 9 extending in forward direction with respect to plate-shaped part 3 is attached to the underside of said plate-shaped part 3, near the centre of said plate-shaped part 3. A plate 10 extending perpendicularly to arm 9 is attached to the underside of said arm.

An upwardly, generally vertically, extending pin 11 is attached to central portion 2 of carrier 1, which pin is journaled in a bearing 12 with its lower end, in such a manner as to be freely rotatable about its central pivot axis, said bearing being attached to arm 9 of an adjacent carrier, as will be apparent in particular from Figure 3.

Guide wheels 13 are provided near the ends of each

carrier 1 by means of arms 14 attached to the carrier, all this in such a manner that said guide wheels 13 are freely rotatable about axes of rotation extending parallel to pivot pins 11. During operation said guide wheels 13 will roll along guide rails 15 forming part of the frame of the conveyor.

In addition to that further guide wheels 16 are provided near the ends of each carrier, which guide wheels are connected to the respective carrier by means of arms 17. The guide wheels 16, which likewise co-operate with the guide rails 15, are thereby rotatable about axes of rotation which cross the axes of rotation of guide wheels 13 perpendicularly.

As will be apparent in particular from Figure 2, the arrangement is such that the central axis of a pivot pin 11 connected to one carrier 1, about which two adjacently arranged carriers are pivotable with respect to each other, lies in one plane with the axes of rotation of guide wheels 13, which are connected to the other carrier 1 of the two carriers connected by pin 11. The position of a carrier near the guide wheels 13 being rotatable about axes of rotation is precisely determined by the guide rail 15 co-operating with said guide wheels 13, whilst movement in a direction transversely to the guide rails is prevented. Since the central axis of the pivot pin 11 connected to the adjacent carrier lies in the same plane, undesirable movement of said pivot pin 11 transversely to the longitudinal direction of the rails 15, and thus undesirable oscillating movement of the respective carrier about an imaginary upwardly extending axis is likewise prevented. Wheels 16, which are disposed near wheels 13, prevent undesirable oscillating movements of the carrier about an imaginary axis extending in the longitudinal direction of said carrier, perpendicularly to the plane of the drawing of Figure 4.

Linear motors 18 diagrammatically indicated in Figure 4 may be used efficiently for driving the endless conveying element built up by means of the carriers, which motors co-operate with the plates 10 connected to the carriers. It would also be possible, however, to use driving belts or the like co-operating with plates 10 for said driving.

The embodiment of the conveyor according to the invention shown in Figures 5 - 7 largely corresponds with the embodiment described above with reference to Figures 1 - 4, and consequently like parts are numbered alike in the various Figures.

In this embodiment the plate 10 attached to arm 9 is substituted for a plate 19, which has been turned through an angle of 90° with respect to the position which plate 10 occupies. Linear motors 20 disposed under plates 19 may be used for driving the endless conveying element assembled from the carriers. Said linear motors 20 will exert a downward force, seen in Figure 7, on the carriers, and said force can be taken up by wheels 16, which are connected to the carriers.

As is furthermore shown in Figures 6 and 7, the guide wheels 8 co-operating with the pusher elements

may thereby be arranged in such a manner that said guide wheels are disposed under plates 19. A significant advantage of this is that the guide rails co-operating with guide wheels 8 need not be interrupted to make it possible for plates 19 to pass. Consequently no separate measures need to be taken to ensure a proper guidance of the guide rollers 8 for moving the pusher shoes to and fro along the respective carrier. This leads to a considerable simplification of the construction of the conveyor.

Figure 8 furthermore shows an embodiment wherein a guide wheel 16' runs in a U-shaped guide rail 15 and wherein said guide wheel is positioned on the side of the upright leg of the guide rail facing away from the side of the guide rail that co-operates with guide wheel 13'. It will be apparent that such an arrangement of the guide wheels 13' and 16' makes it possible to arrange the axes of rotation of the various guide wheels 13' and 16' connected to a carrier in one plane, which is particularly advantageous with a view to preventing oscillating movements of the respective carrier about its longitudinal axis.

Claims

1. A conveyor provided with a frame and with an endless conveying element, which can be moved in its longitudinal direction by driving means during operation and which is provided with interconnected carriers, which are pivotable with respect to each other about upwardly extending pivot axes, whilst the carriers are guided by means of guide wheels coupled to said carriers, which during operation roll on guide rails connected to the frame, characterized in that said carriers are near their ends provided with guide wheels, which are rotatable about axes of rotation extending parallel to said pivot axes, whilst a pivot axis, about which a carrier is pivotable with respect to the adjacent carrier, lies at least substantially in one plane with the axes of rotation extending parallel to said pivot axis of the guide wheels provided on said adjacent carrier.
2. A conveyor according to claim 1, characterized in that guide wheels being rotatable about axes of rotation crossing the pivot axes at least substantially perpendicularly are provided near the side of a carrier, near the guide wheels provided on the carrier in question, which guide wheels are provided in such a manner as to be rotatable about axes of rotation extending parallel to said pivot axis.
3. A conveyor according to claim 1 or 2, characterized in that the axes of rotation of the guide wheels connected to a carrier all lie in one plane.
4. A conveyor according to any one of the preceding claims, characterized in that a carrier is provided

with an arm which during operation extends in forward direction, seen in the intended direction of movement of the respective carrier, by which the respective carrier is coupled to an adjacent carrier by means of said pivot axis.

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5. A conveyor according to any one of the preceding claims, characterized in that a plate is attached to a carrier for co-operation with a linear motor accommodated in the frame of the conveyor.

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6. A conveyor according to claim 5, characterized in that said plate extends substantially perpendicularly to the upper surface of the carrier and in that a linear motor co-operating with said plate is mounted in said frame, at a lower level than said plate, whilst a pusher shoe is movable along said carrier, said pusher shoe being connected to a guide member for the pusher shoe positioned under said carrier, which guide member is disposed at a lower level than the plate connected to the respective carrier, which co-operates with a linear motor during operation.

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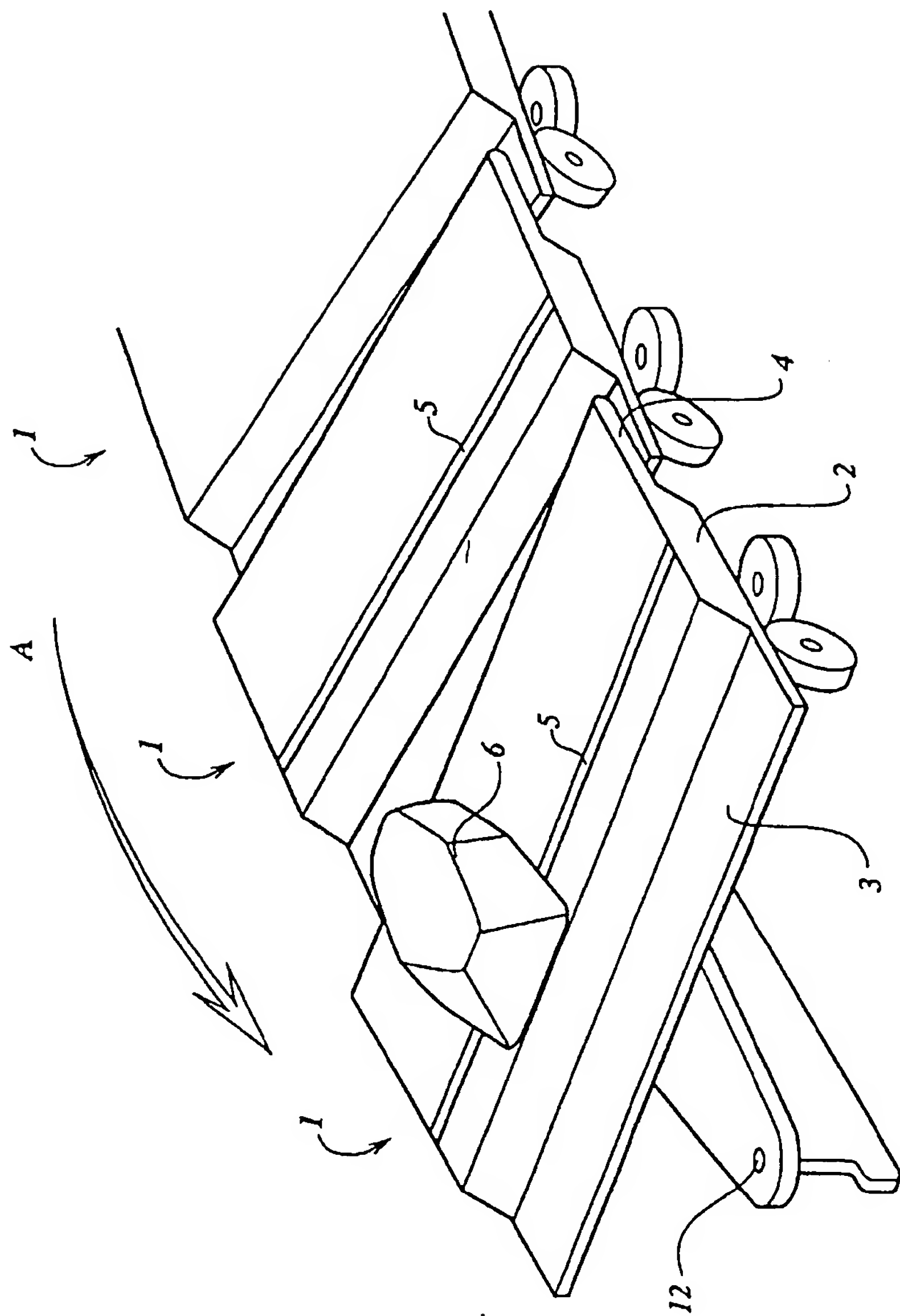
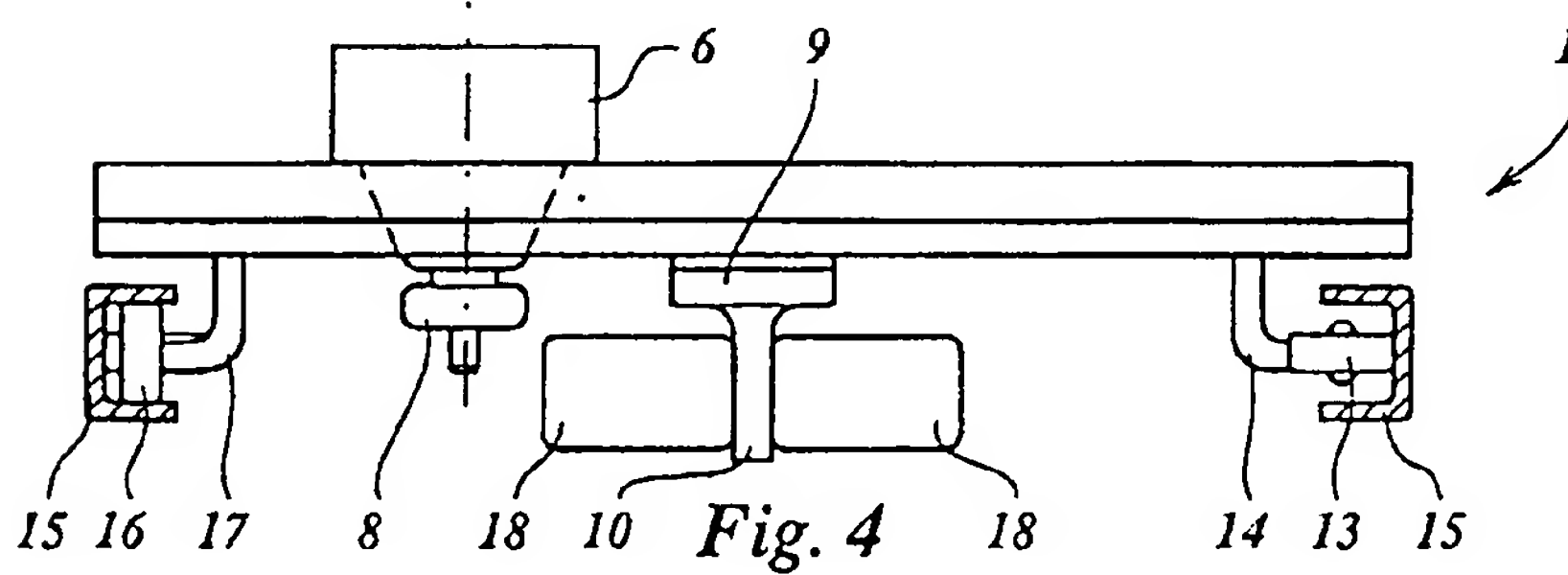
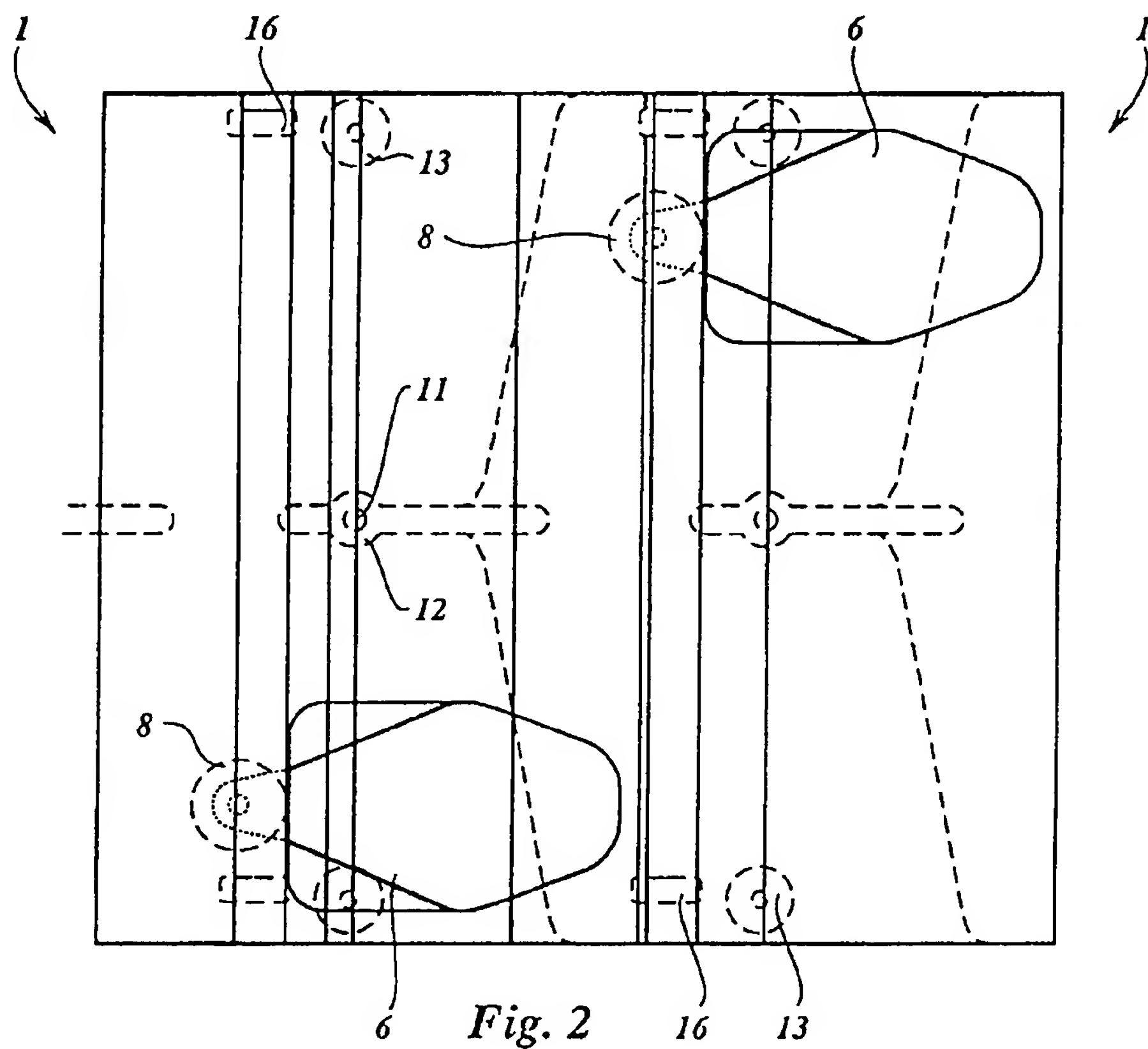
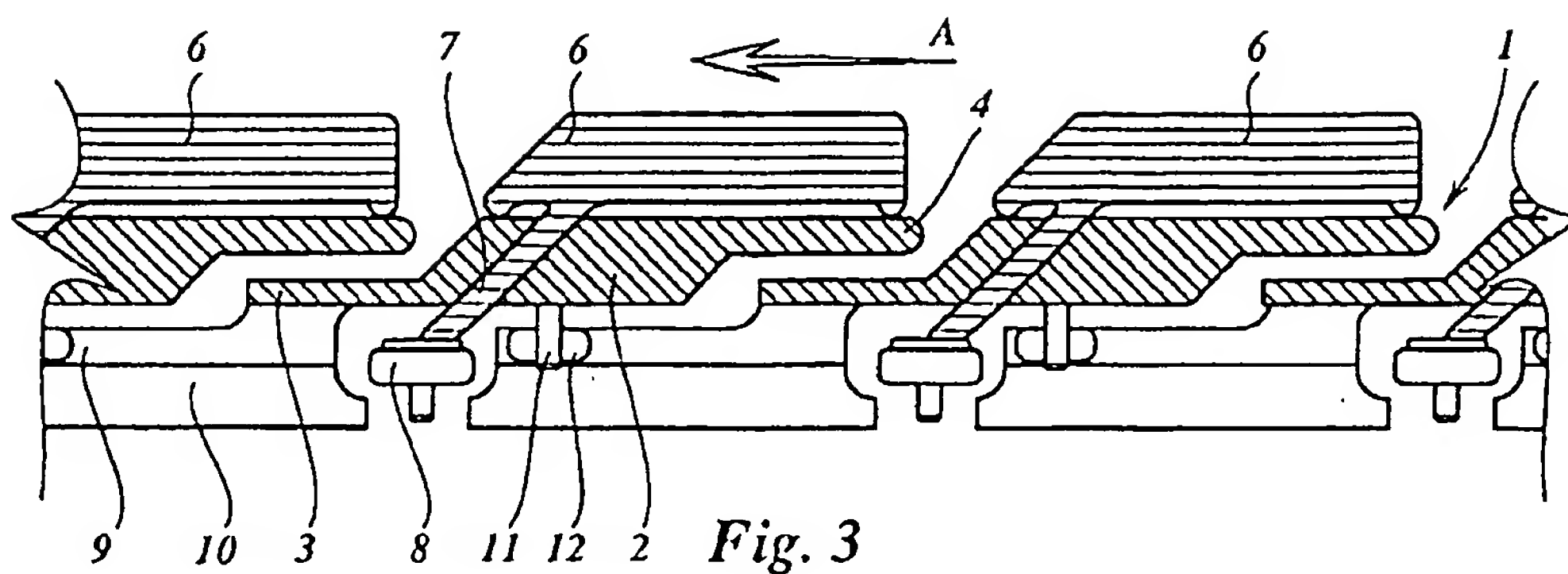
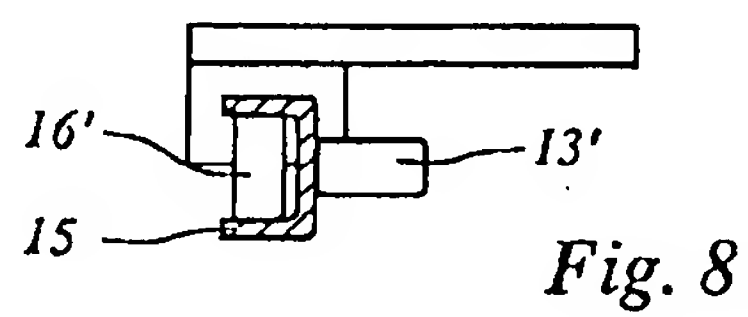
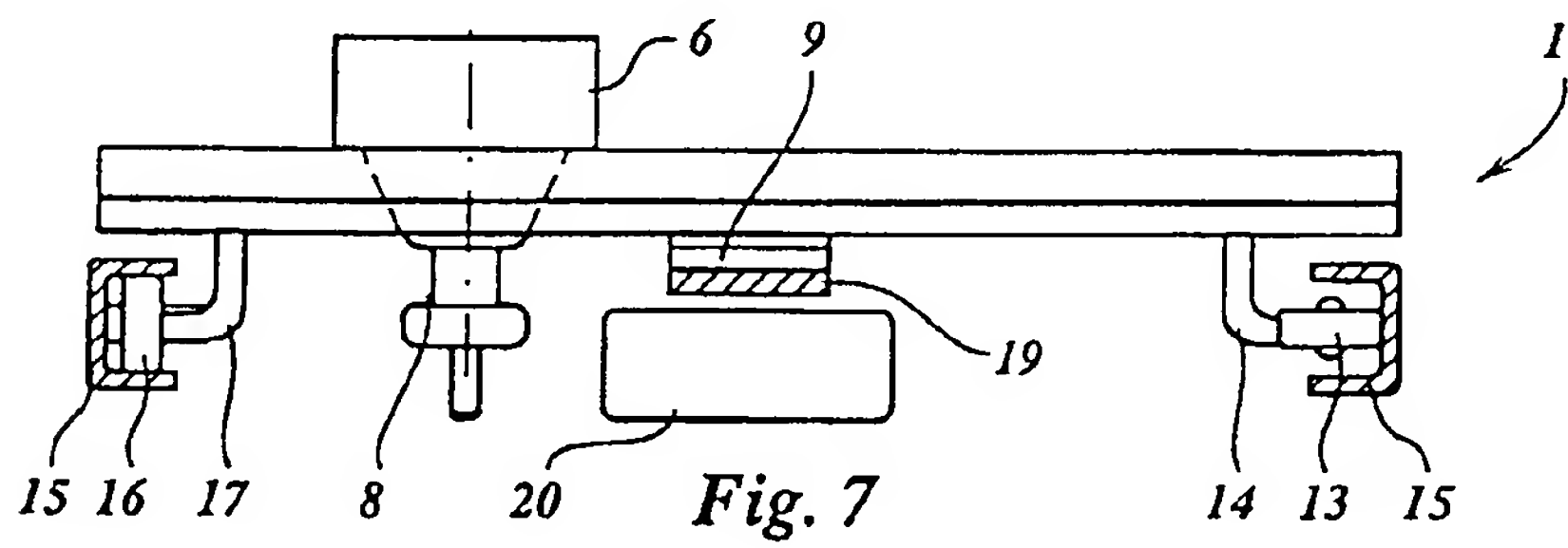
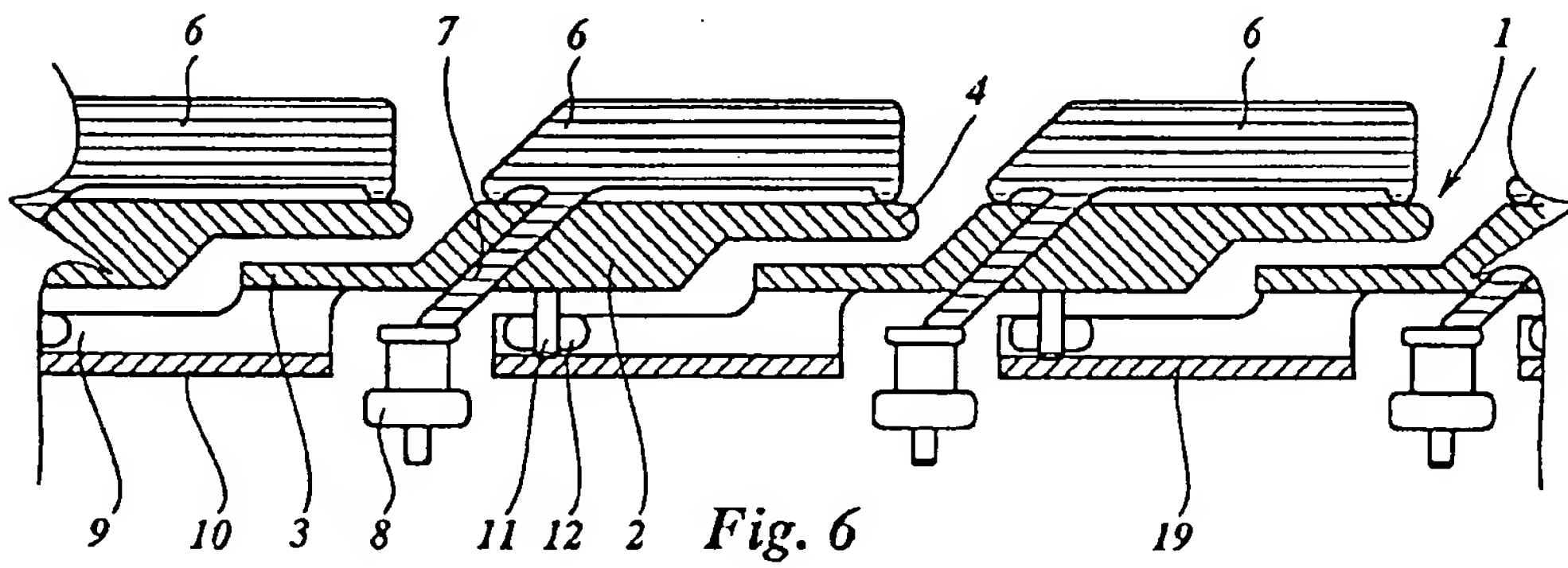
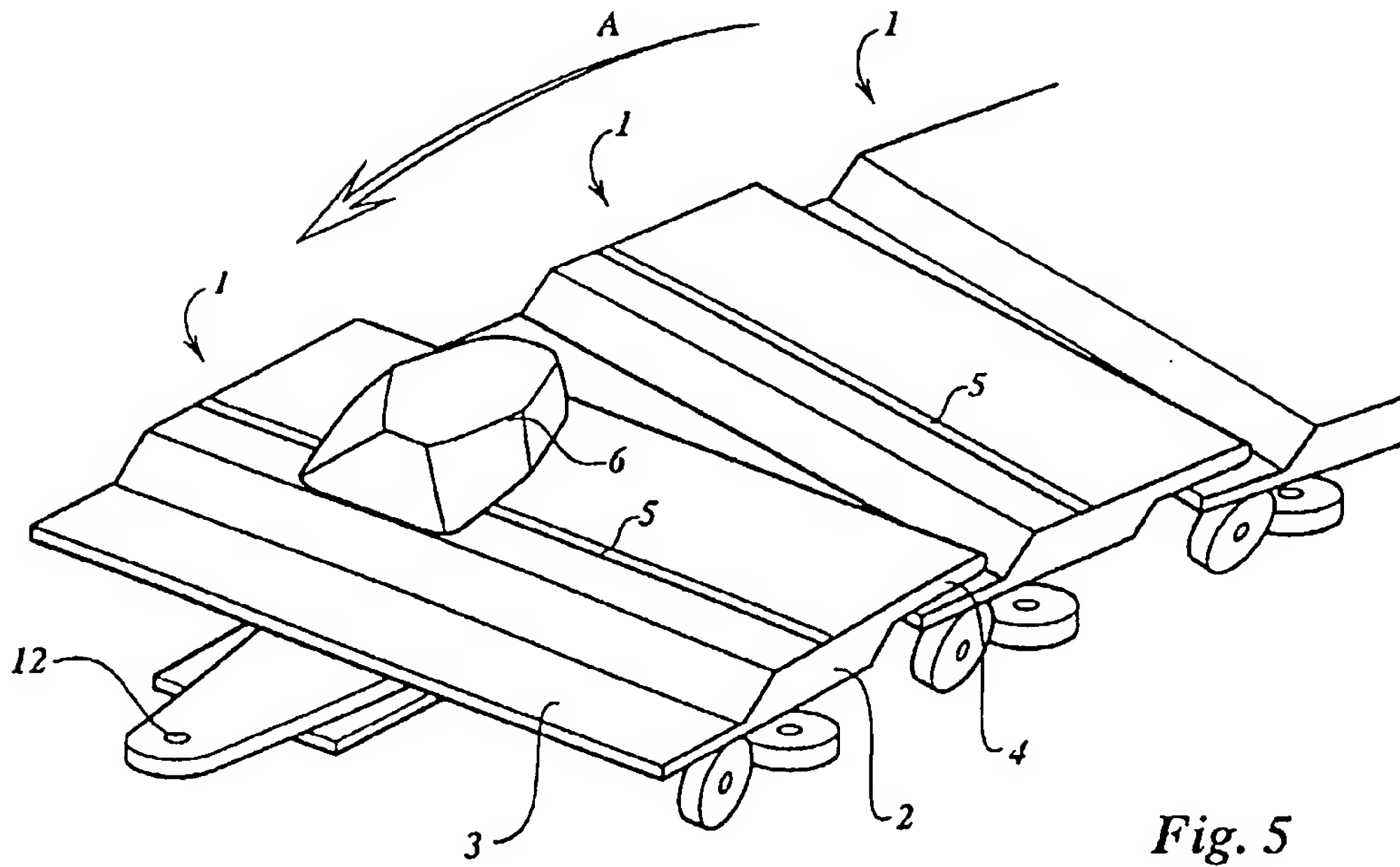


Fig. 1







European Patent
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EUROPEAN SEARCH REPORT

Application Number
EP 97 20 0026

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
A	FR 2 351 884 A (S.A. TISSMETAL LIONEL-DUPONT) 16 December 1977 * the whole document *	1	B65G17/08 B65G47/84
A	FR 2 388 737 A (CANZIANI FRANCESCO) 24 November 1978 * the whole document *	1	
			TECHNICAL FIELDS SEARCHED (Int.Cl.8)
			B65G
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 8 April 1997	Examiner Van Rollegheem, F
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